



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : G07F 11/42	A1	(11) International Publication Number: WO 00/41144 (43) International Publication Date: 13 July 2000 (13.07.00)
(21) International Application Number: PCT/NL00/00005		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TI, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: 4 January 2000 (04.01.00)		
(30) Priority Data: 1010947 4 January 1999 (04.01.99) NL 1012299 11 June 1999 (11.06.99) NL		
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(54) Title: AUXILIARY DEVICE FOR ADDING TO A DISPENSING DEVICE FOR ARTICLES AND THE COMBINATION OF A DISPENSING DEVICE AND AN AUXILIARY DEVICE		
(57) Abstract		
The invention relates to an auxiliary device for adding to a device for dispensing a selected article in accordance with the choice of a user, which device comprises a housing with a closable front door; carrier means accommodated in this housing for carrying stocks of articles at different heights, which carrier means also comprise transport means for dispensing the chosen article on the free front side of the carrier means at a height specific to the choice which has been made, the free front side of which carrier means is situated at a certain free spacing from the front door in closed position; a receiving bin accommodated in the housing for receiving a dispensed article; an access opening, via which the user can remove an article lying in the receiving bin; which auxiliary device comprises: lifting means for carrying the receiving bin to said specific height prior to dispensing of an article and for carrying the receiving bin to the height of the access opening after dispensing, which lifting means are movable up and downward in the space defined by said free spacing.		

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5 **AUXILIARY DEVICE FOR ADDING TO A DISPENSING DEVICE FOR
ARTICLES AND THE COMBINATION OF A DISPENSING DEVICE AND
AN AUXILIARY DEVICE**

Vending machines exist for dispensing a chosen and paid article after payment and selection has been made by a consumer. It is possible to envisage here for instance rolls of film as well as measured quantities of food products, for instance drinks cans, tubs of yoghurt, bars of chocolate and the like.

10 Such a vending machine shows on the front side or viewing side which products are offered for sale. For this purpose the closable front door can for instance have a window of glass or an acryl material. The products or articles in question are situated on carriers ordered one above another, while means are present for displacing the article in question over the free front edge of the relevant carrier after a selection and payment have been made by a user such that the article drops downward via a free space between the front edge of the carrier and the front door, whereafter the falling article is received in a receiving bin placed at low height. Connecting onto this bin is an access opening optionally closable by means of a swing door or lid, via which opening the user can remove an article lying in the receiving bin.

15 The drawback of such a known device is that in the case of a relatively great drop height the products in question can be damaged, while the receiving of for instance a drinks can in the bin is accompanied by substantial noise.

In order to obviate this inconvenience it has been

proposed to add an individual receiving bin to each carrier. The drawback of such a structure is that it is considerably more expensive and that the use of a plurality of receiving bins limits still further the 5 available space, which is generally limited enough already, and moreover obstructs the view from outside of the displayed articles.

It is an object of the invention to furnish provisions 10 whereby the products drop through only a very limited height, whereby noise and the danger of damage are practically precluded, while the view of the displayed articles is nevertheless unobstructed.

15 It is a further object of the invention to embody the provisions serving this purpose such that they can be realized at very low cost.

In respect of the above the invention provides an 20 auxiliary device for adding to a device for dispensing a selected article in accordance with the choice of a user; which device comprises: a housing with a closable, optionally transparent front door; carrier means accommodated in this housing for carrying stocks of 25 articles, optionally of different types, at different heights, which carrier means also comprise transport means for dispensing the chosen article on the free front side of the carrier means at a height specific to the choice which has been made, this under the control 30 of control means controlled by a user by means of operating means, the free front side of which carrier means is situated at a certain free spacing from the front door in closed position; a receiving bin accommodated in the housing for receiving a dispensed 35 article; and an access opening, via which the user can remove an article lying in the receiving bin; which auxiliary device comprises: lifting means for carrying

the receiving bin to said specific height prior to dispensing of an article and for carrying the receiving bin to the height of the access opening after dispensing, which lifting means are movable up and 5 downward in the space defined by said free spacing.

A specific embodiment of the auxiliary device according to the invention has the special feature that the carrier means are adapted to carry the articles in 10 mutually parallel rows.

A simple and reliable embodiment has the special feature that the transport means comprise respective endless conveyors.

15 Since the drawback of endless conveyors can be that they require a certain installing height as use must be made of two reversing rollers between the active upper part and the inactive lower part, use can advantageously be 20 made of an embodiment in which the transport means comprise respective pairs of synchronously drivable helical conveyors at equal pitch distances. The helical conveyors can for instance be embodied as substantially rigid helically wound wires, pairs of which have a pitch 25 in opposing directions. This effectively avoids the occurrence of a lateral force component, whereby reliable transport is ensured in longitudinal direction of the row in question.

30 For instance in the case of very vulnerable articles, for instance one or more portions of pastry, these articles or groups of articles can be carried by respective carriers which are mechanically capable of being transported by the helical conveyors.

35 A very simple and reliable structure is that in which the receiving bin is vertically guided and driven on

both sides.

- Another aspect of the invention can entail driving taking place by means of two chains or toothed belts
- 5 which are coupled to the receiving bin on the respective sides. In this embodiment a motor, optionally via a reducing transmission, can for instance drive a horizontal drive shaft, on both ends of which is situated a toothed wheel round which the respective
- 10 chains or toothed belts are trained. A perfect synchronization of the drive on both sides and a perfect horizontal position of the receiving bin are hereby always ensured.
- 15 The vertical guiding can take place by making use of per se known guide means, for instance two rails and slide or roller elements co-acting therewith. A very inexpensive, maintenance-free and reliable guide can be based for instance on sliding.
- 20 An advantageous embodiment of the invention is one wherein substantially all components of the auxiliary device are mounted on a frame. Such a frame can be incorporated in simple and rapid manner in an existing vending machine according to the prior art.
- Furthermore the invention relates to the combination of a per se known dispensing device for articles and an auxiliary device provided with lifting means which is
- 30 added to the dispensing device. It should be appreciated in this respect that the auxiliary device can be accommodated in very simple manner in the space defined by the free spacing between the free front part of the carriers and the front door, particularly when the
- 35 components of the auxiliary device are mounted on a frame which can be placed in simple manner in an existing vending machine.

The described combination can advantageously have the special feature that the auxiliary device is arranged on the inner surface of the front door.

- 5 Finally the invention also relates to a method for dispensing a selected article in accordance with the choice of a user, comprising the steps of: carrying stocks of articles, optionally of different types, at different heights in a housing with a closable,
- 10 optionally transparent front door; dispensing a chosen article on the free front side of the stocks of articles at a height specific to the choice which has been made, the free front side of which stocks of articles is situated at a certain free spacing from the front door
- 15 in closed position; receiving the dispensed article in a receiving bin accommodated in the housing; removing by the user of the article lying in the receiving bin via an access opening; which method further comprises the steps of: carrying the receiving bin to said specific
- 20 height prior to dispensing of the article and carrying the receiving bin to the height of the access opening after dispensing, by moving the receiving bin up and downward in the space defined by said free spacing.
- 25 The selection made by the user corresponds with dispensing of a specific article. This article is dispensed at a height determined by the control means via memory means. Prior to dispensing the receiving bin must be transported from the level of the dispensing
- 30 opening (the rest position) to the relevant dispensing height. So as to enable determining of the arrival at the correct height use is preferably made of optical means, for instance a light source and a photocell added thereto. Such a combination can be added to each
- 35 carrier. The advantage of such a structure over an alternative consisting of the use of a stepping motor is that when the lay-out of the device is changed, in

particular when the height of the carriers is changed, no reprogramming steps for the central control means are required. Energizing of the lifting means is in any case interrupted immediately on reaching the height defined
5 by the shelf and the optical means added thereto.

The invention will now be elucidated with reference to the annexed drawings. Herein:

- 10 Figure 1 shows a perspective view from the front of a combination of a vending device for separate articles and an auxiliary device according to the invention;
- 15 figure 2 is a perspective view of a number of essential components of the combination of figure 1;
- figure 3 shows on enlarged scale a partly perspective view of the front door with the auxiliary device;
- 20 figure 4 shows on enlarged scale a partly perspective transparent view of a part of the front door with the auxiliary device of figure 3 as seen from the front;
- 25 figure 5 shows the detail V of figure 4;
- figure 6 shows a perspective view of an auxiliary device wherein the components are mounted on a frame;
- 30 figure 7 shows a perspective view of the auxiliary device of figure 6 mounted in a front door.

Figure 1 shows a combination 1 of a vending machine 2 for products 3 such as soft drink cans and an auxiliary device, a component of which, i.e. a receiving bin 4, is
35 visible via the transparent window of the front door 6 of machine 2.

By paying via a coin-operating device 7 and operating push-button array 8 a consumer can make a selection relating to the product to be purchased. As shown schematically, the products in question are disposed in rows one behind another inside the spaces defined by the windings of respective helical conveyor screws 9, through rotation of which an article can be shifted to the front of the associated carrier 10. The foremost article can thus be pushed over the front edge 11 of a carrier 10 and then received in receiving bin 4 which is placed at the drawn correct height by a central signal processing device (not shown) coupled to the push-button array 10 and coin-operating device 7 prior to said forward transport of a product 3.

15

Once product 3 has been received in receiving bin 4, this latter is moved downward by a central control unit to the area of the dispensing opening 13 closed by a swing door. When bin 4 has arrived in this vicinity, release of swing door 12 takes place in the manner to be described below, whereafter the consumer can push swing door 12 rearward and remove product 3 from receiving bin 4. As soon as this action has been performed, the locking of the swing door comes into operation again and is only released again after the following cycle of the above described type.

For a proper understanding of the invention, attention is drawn to the fact that in the prior art the vending machine 2 is embodied such that between window 5 and the front edges 11 of carriers 10 there is a free space such that in known machines a product pushed over this front edge 11 can drop a certain distance downward to be received in a receiving bin.

35

The available space in question can be used in the combination of vending machine and auxiliary device

according to the invention to be described hereinbelow to accommodate the auxiliary device in this space without extensive modifications of the vending machine being necessary. It is particularly important that 5 receiving bin 4 be dimensioned such that it fits into and can be guided for up and downward movement in said space.

As shown in figure 2, an auxiliary device generally 10 designated 4 is fixed on the inner side of door 6 such that window 5 is left completely clear to present the products for sale, and mounting takes place on the edges, for the sake of convenience generally designated 15, situated around window 5. For mechanical arrangement 15 of auxiliary device 14 it thus suffices to drill a number of holes in the relevant edges 15. It will be apparent that the central control unit will further have to be augmented with provisions whereby the selected energization of a conveyor screw 9 is combined with a 20 correct control of receiving bin 4 and release of swing door 12.

Attention is drawn to the fact that the per se known 25 drive provisions for conveyor screws 9 are not shown. These are embodied such that the relevant selected conveyor screw 9 executes precisely one rotation for dispensing of a product 3.

Bin 4 is guided for vertical movement by guide profiles 30 16, 17. Vertical displacement of bin 4 takes place by means of respective toothed belts 18, 19. The toothed belts are trained for this purpose round toothed wheels 20, 21 which are mounted in a manner locked against rotation on a drive shaft 22 which is driven via the 35 central control unit by a motor/transmission unit 23. Swing door 12 is hinged round a shaft 24 and is locked in the rest position by means of an electromagnetically

operating lock, in the rest position of which a locking pin 26 protrudes upward through a hole 27 in the bent lower edge 28 of swing door 12, whereby in the situation shown in figure 3 the swing door is locked and cannot be moved inward from outside. Once the receiving bin 4 with a selected product therein has arrived in the zone of swing door 12 through correct control, the central control unit energizes lock 25, whereby locking pin 26 is retracted and the swing door thus released, and the user can remove the selected product from outside.

Figures 4 and 5 show several further structural features. It is noted that for the sake of clarity in the drawing, figure 5 shows that teeth 29 of toothed belt 18 are situated only on the active inner part and that toothed wheel 20 (as toothed wheel 21) is provided with two edges with a larger radial dimension than the active part of the toothed wheel, thus ensuring that toothed belt 18 cannot unintentionally come off toothed wheel 20.

Figures 6 and 7 show how the components of the auxiliary device of figure 6 are mounted in a rectangular frame 30, which frame 30 is mounted as according to figure 7 in the front door 6 of vending machine 2. Also shown is that receiving bin 4 can be mounted releasably in a holder 31 so that receiving bin 4 can easily be replaced, for instance for cleaning purposes.

Attention is drawn to the fact that for the sake of clarity the figures 1 and 2 do not show that carriers 10 are preferably provided with elongate separating elements, such as metal strips, for urging the products 3 in the transporting direction during driving of conveyor screws 9.

Attention is further drawn to the fact that the conveyor

screws can also be disposed in double-sided manner in the form of respective pairs of synchronously drivable helical conveyors at equal pitch distances.

CLAIMS

1. Auxiliary device for adding to a device for dispensing a selected article in accordance with the choice of a user;
5 which device comprises:
 - a housing with a closable, optionally transparent front door;
 - 10 carrier means accommodated in this housing for carrying stocks of articles, optionally of different types, at different heights, which carrier means also comprise transport means for dispensing the chosen article on the free front side of the carrier means at a height specific to the choice which has been made, this under the control of control means controlled by a user by means of operating means, the free front side of which carrier means is situated at a certain free 15 spacing from the front door in closed position;
 - 20 a receiving bin accommodated in the housing for receiving a dispensed article; and
 - 25 an access opening, via which the user can remove an article lying in the receiving bin; which auxiliary device comprises:
 - 30 lifting means for carrying the receiving bin to said specific height prior to dispensing of an article and for carrying the receiving bin to the height of the access opening after dispensing, which lifting means are movable up and downward in the space defined by said free spacing.
- 35 2. Auxiliary device as claimed in claim 1, wherein the carrier means are adapted to carry the articles in mutually parallel rows.

- 3 . Auxiliary device as claimed in claim 1 or 2, wherein the transport means comprise respective endless conveyors.
 - 5 4 . Auxiliary device as claimed in any of the foregoing claims, wherein the transport means comprise respective pairs of synchronously drivable helical conveyors at equal pitch distances.
 - 10 5 . Auxiliary device as claimed in any of the foregoing claims, wherein the receiving bin is vertically guided and driven on both sides.
 - 15 6 . Auxiliary device as claimed in claim 5, wherein the driving takes place by means of two chains or toothed belts which are coupled to the receiving bin on the respective sides.
 - 20 7 . Auxiliary device as claimed in any of the foregoing claims, wherein substantially all components of the auxiliary device are mounted on a frame.
 - 25 8 . Combination of a device and an auxiliary device as specified in any of the foregoing claims.
 - 9 . Combination as claimed in claim 8, wherein the auxiliary device is arranged on the inner surface of the front door.
 - 30 10 . Combination as claimed in claim 8 or 9, wherein substantially all components of the auxiliary device are mounted on a frame.
 - 35 11 . Method for dispensing a selected article in accordance with the choice of a user; comprising the steps of:
 - carrying stocks of articles, optionally

of different types, at different heights in a housing with a closable, optionally transparent front door;

5 dispensing a chosen article on the free front side of the stocks of articles at a height specific to the choice which has been made, the free front side of which stocks of articles is situated at a certain free spacing from the front door in closed position;

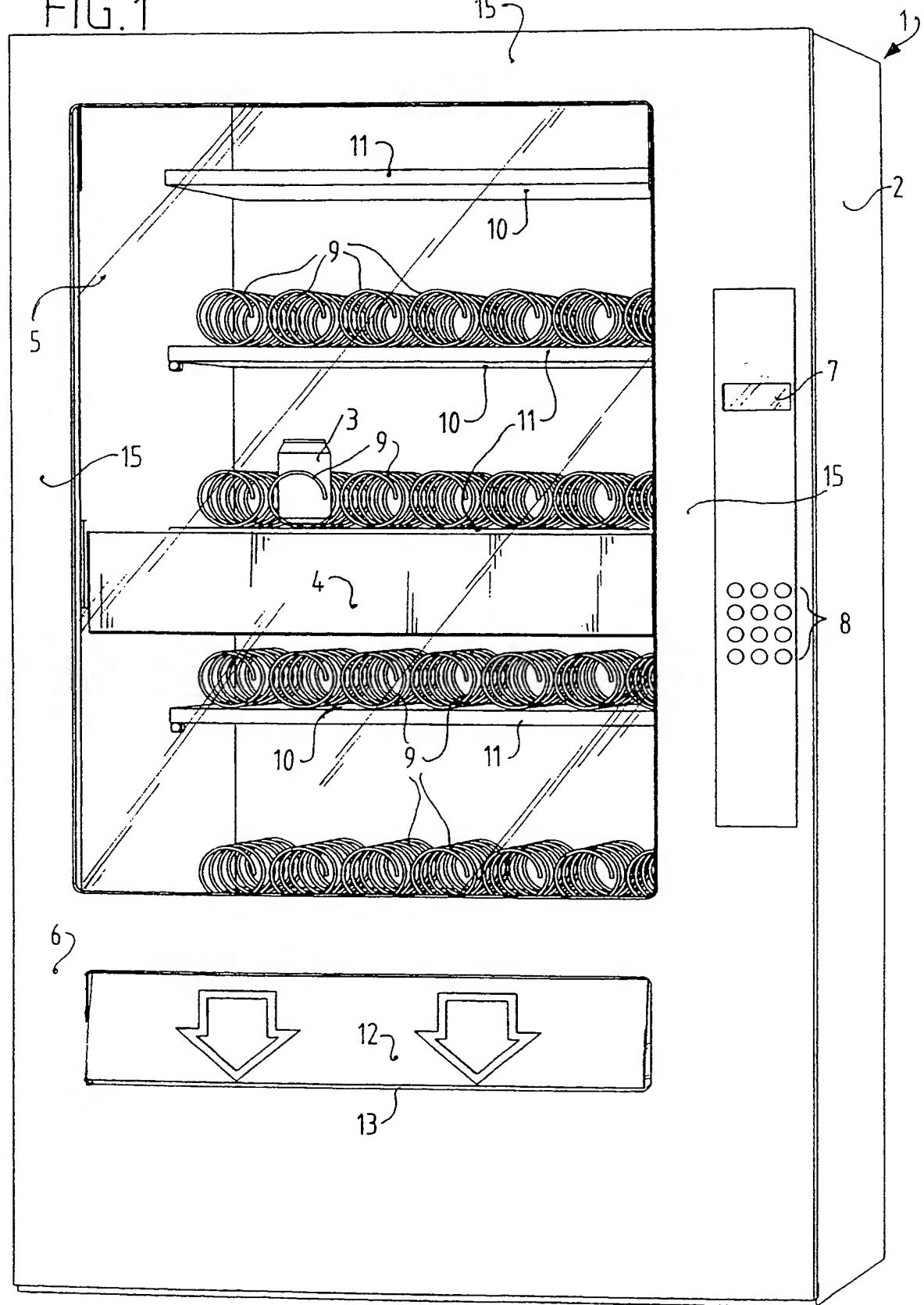
10 receiving the dispensed article in a receiving bin accommodated in the housing;

removing by the user of the article lying in the receiving bin via an access opening; which method further comprises the steps of:

15 carrying the receiving bin to said specific height prior to dispensing of the article and carrying the receiving bin to the height of the access opening after dispensing, by moving the receiving bin up and downward in the space defined by said free spacing.

20

FIG. 1



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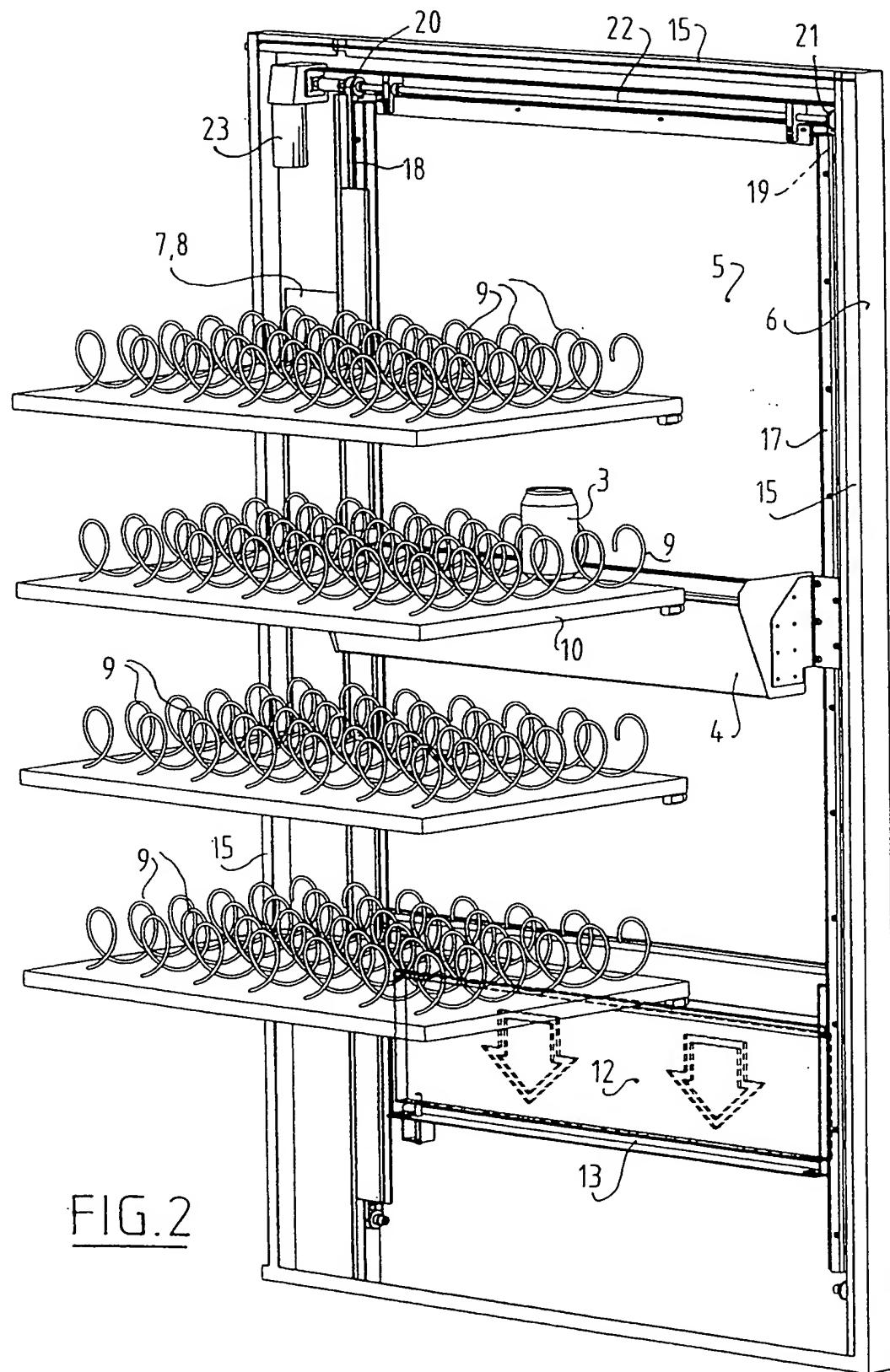
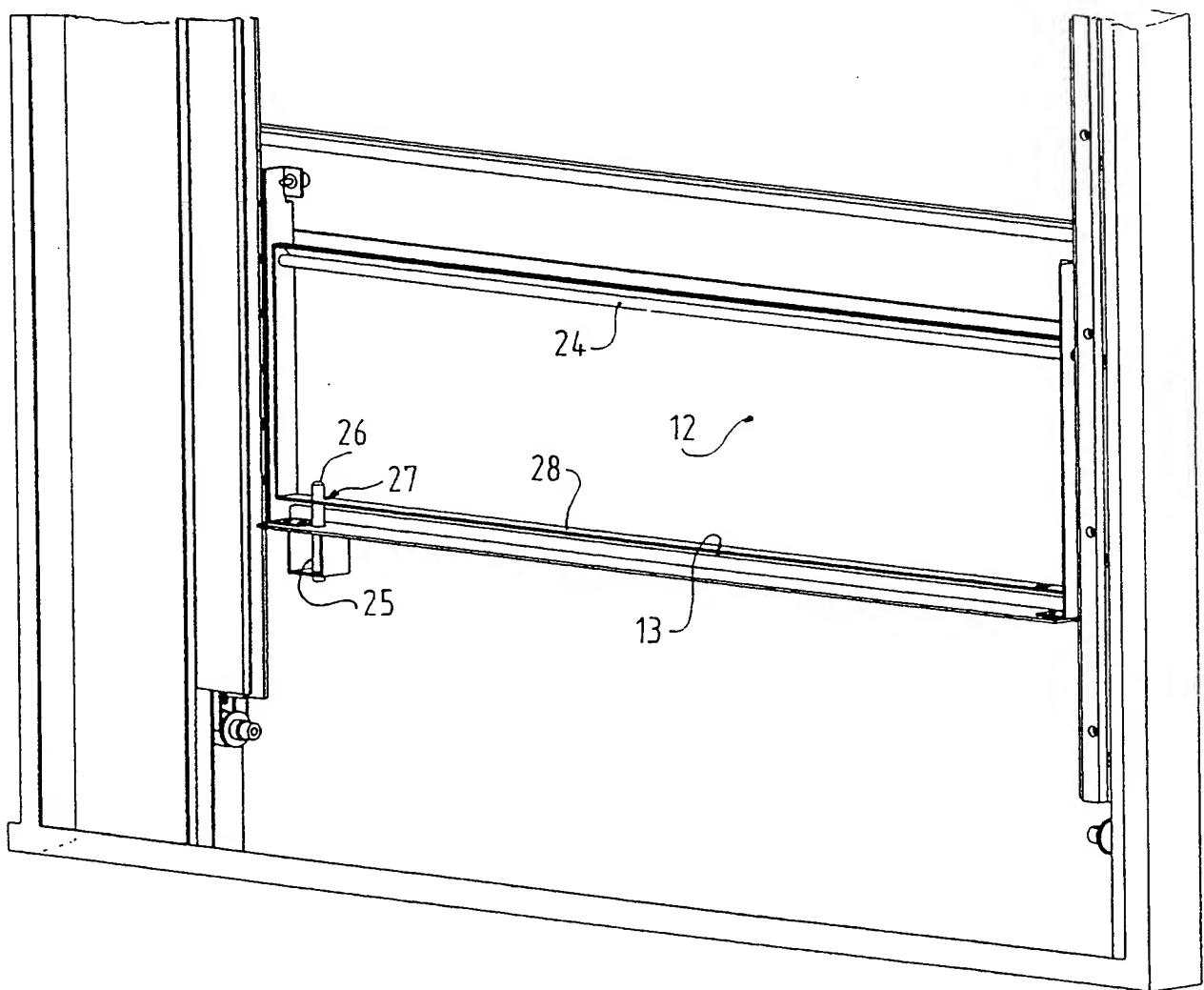
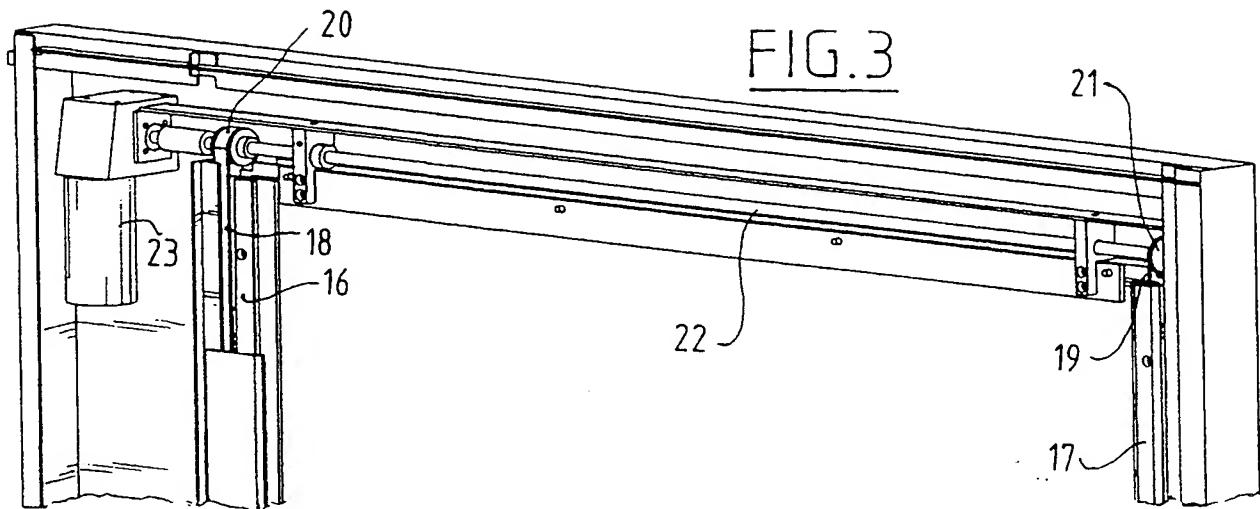
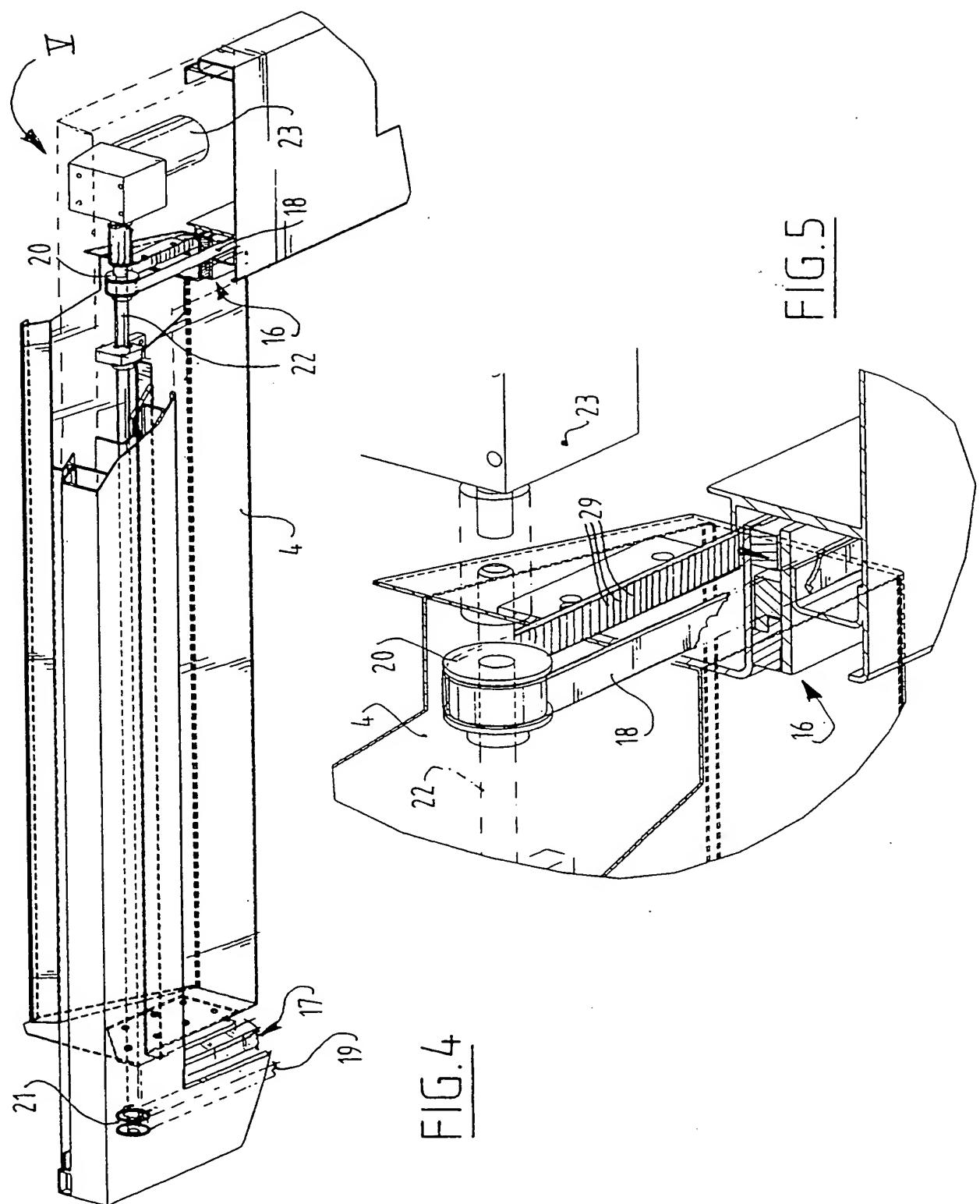


FIG.2

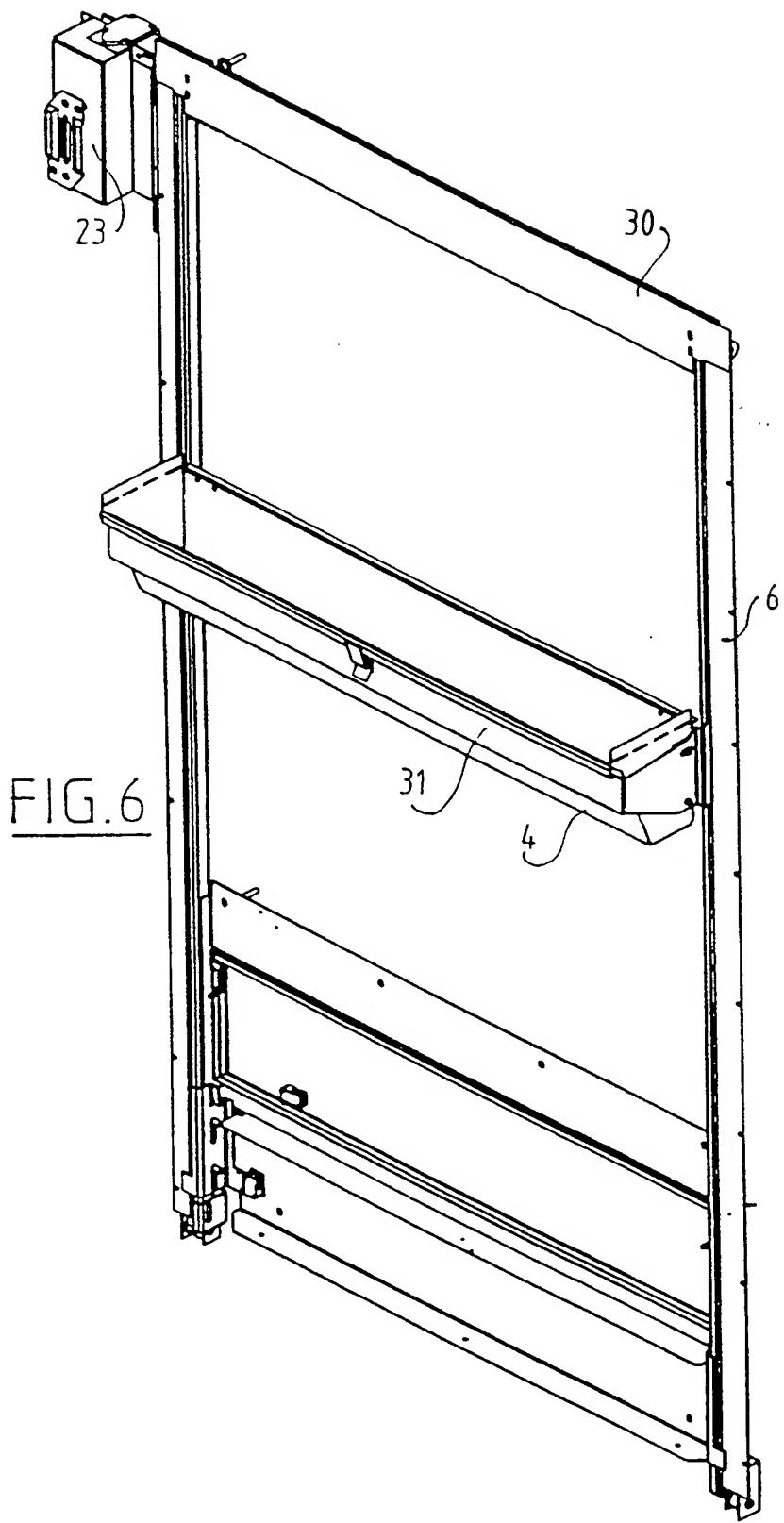
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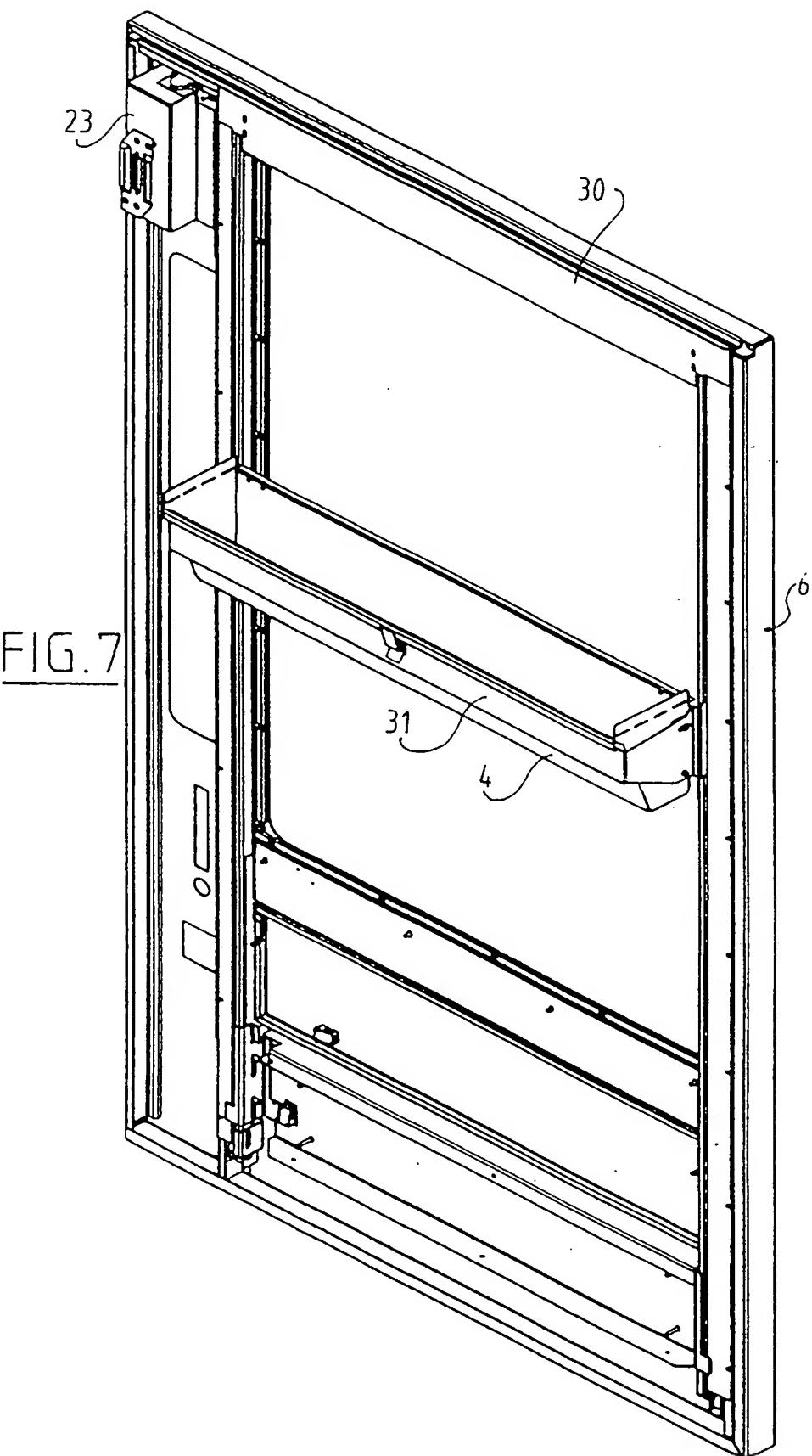
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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07F11/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G07F B65H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FR 2 749 960 A (VOLPATTI MIREILLE) 19 December 1997 (1997-12-19) page 2, line 27 -page 4, line 11 abstract; figures 1,2	1-11
Y	US 5 439 134 A (TSUDA KIICHIRO ET AL) 8 August 1995 (1995-08-08) column 1, line 49 -column 5, line 29 figures 1-4,8	1-11
A	US 4 483 459 A (TAYLOR MICHAEL ET AL) 20 November 1984 (1984-11-20) column 1, line 4 -column 5, line 21 figures 1-3	1,5-7,11



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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03/04/2000

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 277 512 A (KENTINENTAL ENG) 2 November 1994 (1994-11-02) page 1, line 1 -page 3, line 28 abstract; figures 1-4,7 _____	1,5,6,11
A	FR 2 730 840 A (JC DECAUX) 23 August 1996 (1996-08-23) the whole document _____	1

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Information on patent family members

Inten. nal Application No

PCT/NL 00/00005

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
FR 2749960	A	19-12-1997	WO EP	9922347 A 0968486 A	06-05-1999 05-01-2000
US 5439134	A	08-08-1995	JP	6290338 A	18-10-1994
US 4483459	A	20-11-1984	EP JP	0071438 A 58044592 A	09-02-1983 15-03-1983
GB 2277512	A	02-11-1994	AU EP WO JP	6573594 A 0697121 A 9425941 A 8509561 T	21-11-1994 21-02-1996 10-11-1994 08-10-1996
FR 2730840	A	23-08-1996	NONE		